MONITORING RECLAMATION SUCCESS

Monitoring Responsibilities per FEIS DP-B-5.1

It is the responsibility of the operator to monitor reclaimed areas, determine if reclamation criteria are being met, develop and implement remedial actions if success standards are not being met, provide resulting data to the BLM and JIO annually, and request concurrence from BLM that success standards have been met and monitoring is no longer required.

It is the responsibility of the JIO to evaluate the annual monitoring reports, provide concurrence (or not) with the reclamation assessments as to whether or not success standards are being met and the rationale for the determination, and provide recommendations to the BLM for Roll-Over and Final reclamation acceptance.

It is the responsibility of the BLM to determine acceptance of JIO recommendations and to provide operators with remedial actions when reclamation success criteria are not being met. The remedial actions may include such things as soil testing, soil amendments, irrigation, seeding etc.

1. Location of data collection:
    a. A sample representation of the vegetative population will be used to collect the vegetative data on the reclamation and reference site.
    b. The reference site location will represent the ecological characteristics described in the reclamation criteria.
    c. All transect start and end points will be marked by GPS.
2. Timing and frequency of data collection.
    a. Well Pads
        i. A minimum of one monitoring location will be identified on each well pad that is representative of the reclamation site as a whole.
    b. Rights-of-Way
        i. Pipeline rights-of-way require one monitoring location every ¼ mile or change of ecological site (as defined by NRCS soil survey), whichever comes first. Specific monitoring locations may be modified as approved by the BLM Authorized Officer.
        ii. Additionally, multiple pipeline rights-of-way will be monitored by each “linear layer” based on date of disturbance/reclamation.

iii. Pipeline operators of multiple pipeline rights-of-way will establish a maintenance agreement to determine a single responsible party for reclamation monitoring. A copy of the maintenance agreement will be provided to the BLM Authorized Officer and JIO upon implementation.

c. Quantitative Monitoring. (Data collected to measure reclamation success.)

i. Pre roll-over release; monitoring will occur every other year beginning the first growing season post-seeding.

ii. Post roll-over release; 5% of all locations that have met roll-over reclamation for a minimum of five years will be monitored annually. Previously monitored locations must be included in subsequent monitoring on a 5-year cycle, plus new sites necessary to meet the overall 5% requirement.

Example:

In 2007 thru 2020, 100 new locations meet rollover criteria each year. No monitoring is required prior to 2012, when 5% of the sites that met rollover criteria in 2007 will be monitored (5 sites total). In 2013, 200 sites have met rollover criteria (100 in 2007 and 2008), so 10 sites must be monitored, none of which may be those monitored in 2007. This will continue thru 2016, when 25 new sites (not previously monitored) would be monitored. In 2017, the five sites monitored in 2012 would be monitored again, as well as 25 new sites for a total of 30 monitored locations (600 total sites in rollover).

1. Grass production measurements need only be taken when all other reclamation criteria have been met.

d. Qualitative Monitoring. (Data collected to monitor long-term trend.)

i. Will be conducted annually on all reclamation sites until final reclamation criteria have been met. (See Jonah Reclamation Monitoring Trend Worksheet).

3. <u>Data Collection</u>

a. Quantitative Monitoring.

i. Permanent photo points will be established on both the reclamation and reference sites and will be permanently marked by GPS. Photos will be taken as close to the same time of year as previous photos were taken to reduce differences in plant growth characteristics.

1. Close-up pictures show the soil surface characteristics and the amount of ground surface covered by vegetation and litter. Close-ups will be taken at GPS located photo plots. A ½ meter x ½ meter photo plot is recommended.

2. General view pictures present a broad view of a site. Pictures depicting north, south, east, and west will also be established and monitored.

ii. To measure erosion control, a soil surface factor of 1-25% must be achieved. (Accuracy is not consistently closer than ± 5 SSF and therefore allows a SSF of 25% to be considered stable.) See BLM Tech Note 346 below.

iii. The Operator may use any BLM approved monitoring method.

iv. The JIO will use the following monitoring methods to validate roll-over and final release recommendations to the BLM.

1. Ground cover and species composition will be evaluated using line point intercept by plant species method. At a minimum, 200 data points will be collected on each site.

2. Nested Frequency Quadrants will be used to measure frequency. At a minimum, 200 frame plots on each site will be used to calculate data.

3. The density method as described in Sampling Vegetation Attributes Interagency Technical Reference will be used to measure density. At a minimum, 200 frame plots on each site will be used to calculate data.

4. Production measurements will be made using the double sampling method. Data will be collected from a minimum of 20 plots on each site.

b. Qualitative Monitoring.

i. Qualitative monitoring consists of personal observations. The Jonah Reclamation Monitoring Trend Worksheet will be used to collect this data.

ii. Results from qualitative monitoring may require additional photographs.

4. Stages of reclamation. After evaluating the monitoring data, each site will be categorized into one of four stages to determine landscape trends and reclamation status of the Jonah Field.

    a. Stage I - Contouring, soil preparation, and seeding has been completed although perennial vegetation is not yet established. If a site remains in Stage 1 for more than 3 years the BLM may implement remedial actions to facilitate reclamation success.

    b. Stage II - Perennial plants are established and increasing in abundance and vigor.

    c. Stage III - Rollover criteria have been met.

    d. Stage IV - Final reclamation criteria have been met. Operators have been released from bond.

5. Reporting Format:

    a. Documentation of monitoring will be submitted to the JIO in a standardized data format, to be determined.

QUALITATIVE MONITORING SHEET

Well Name/Number _____ Monitoring Date _____

Company _____ Inspector _____

Check 1: □ Well Pad □ Access Road □ Pipeline □ Other

	Monitoring Requirement	Yes	No	Description
1	Area free of undesirable materials			Trash, construction materials, etc.
2	Soil stable with no indications of subsidence, slumping and/or significant downward movement of surface soil materials			Rills greater than 2 inches, accelerated erosion is obvious and soils are not being held by plants on site, perceptible soil movement, sheet flow, or head cutting in drainages, slopes occurring on or adjacent to reclaimed areas
3	Weeds or other undesirable species adequately controlled			Russian thistle, halogeton, cheat grass, etc.
4	Noxious weeds are not present			Perennial pepperweed, Canada thistle, black henbane, leafy spurge, yellow or dalmation toadflax, spotted knapweed, Russian knapweed, etc.
5	Evidence of vegetative reproduction (either spreading rhizomatous species or seed production)			Plants grazed too closely to allow seed production, recent precipitation reduced likelihood of plant reproduction, etc.
6	Grazing utilization (circle one)	Low	Medium	High

For any "No" answers above, please identify the problem and what remedial actions are planned. Attach photographs and notify the JIO as soon as possible.

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Tech Note #346
U.S. Department of the Interior- Bureau of Land Management
Erosion Condition Classification System by Ronnie Clark

Well name and number: _____ **Date:**_____

Operator:_____ **Collector:**_____

Erosional Feature	Potentially Present Yes/ No	Identified Factors (Form 7310-12)	Possible Factor
Soil Movement			14
Surface Litter			14
Surface Rock Fragments			14
Pedestalling			14
Flow Patterns			15
Rills			14
Gullies			15
Column Totals			
Soil Surface Factor Total			
Class			

SSF	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

Procedure:
1. Observe the total sample area and determine an average condition for each of the seven items above.
2. Determine if each item is potentially present as only these items will be considered.
3. For the items potentially present, indicate appropriate numerical value. (Form 7310-12)
4. Total both the weighted values and the potential values for each item.
5. Calculate the total percent SSF: (identified factors / possible factors) X 100.
6. Indicate corresponding condition class site is in.

Comments:

Form 7310-12
Determination of Erosion Condition Class
Soil Surface Factor (SSF)

Well Name/Number: _____ Date: _____

Operator: _____ Collector: _____

Soil Movement	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0 – 0.1 in (0 – 2.5 mm). **0 or 3**	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.1 – 0.2 in (2 – 5 mm). **5**	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.2 – 0.4 in. (5 – 10 mm) **8**	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.4 – 0.8 in. (10 – 20 mm) **11**	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is > 0.8 in. (20 mm) **14**
Surface Litter	No movement, or if present, < 2% of the litter has been translocated and redeposited against obstacles. **0 or 3**	2 – 10% of the litter has been translocated and redeposited against obstacles. **6**	10 – 25% of the litter has been translocated and redeposited against obstacles. **8**	25 – 50%% of the litter has been translocated and redeposited against obstacles. **11**	> 50% of the litter has been translocated and redeposited against obstacles. **14**
Surface Rock Fragments	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is < 0.1 in (2.5 mm). **0 or 2**	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.1 – 0.2 in. (2.5 – 5 mm). **5**	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.2 – 0.4 in. (5 – 10 mm). **8**	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.4 – 0.8 in. (10 – 20 mm). **11**	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is > 0.8 in. (20 mm). **14**
Pedestals	Pedestals are mostly < 0.1 in (2.5 mm) high and/or have a frequency < 2 pedestals/100 ft. **0 or 3**	Pedestals are mostly 0.1 – 0.3 in. (2.5 – 8 mm) high and/or have a frequency of < 2 – 5 pedestals/100 ft. **6**	Pedestals are mostly 0.3 – 0.6 in. (8 – 15 mm) high and/or have a frequency of < 5 – 7 pedestals/100 ft. **9**	Pedestals are mostly 0.6 – 1 in. (15 – 25 mm) high and/or have a frequency of < 7 – 10 pedestals/100 ft. **11**	Pedestals are mostly > 1 in. (25 mm) high and/or have a frequency of > 10 pedestals/100 ft. **14**
Flow Patterns	If present, < 2% surface area shows evidence of recent translocation and deposition of soil & litter. **0 or 3**	2 – 10% surface area shows evidence of recent translocation and deposition of soil & litter. **6**	10 – 25% surface area shows evidence of recent translocation and deposition of soil & litter. **9**	25 – 50% surface area shows evidence of recent translocation and deposition of soil & litter. **12**	> 50% surface area shows evidence of recent translocation and deposition of soil & litter. **15**
Rills	If present, are < 0.5 in (13 mm) deep and at intervals > 10 ft. **0 or 3**	Rills are mostly .5 – 1 in. (132 – 25 mm) deep, and at intervals >10 ft. **6**	Rills are mostly 1 – 1.5 in. (25 – 38 mm) deep, and at intervals > 10 ft. **9**	Rills are mostly 1.5 – 3 in. (38 – 76 mm) deep, and at intervals >10 ft. **12**	Rills are mostly 3 – 6 in. (76 – 152 mm) deep, and at intervals > 5 ft. **14**
Gullies	If present, < 2% of the channel bed and walls show active erosion (no vegetation), gullies make up <2% total area. **0 or 3**	2 – 5% of the channel bed and walls show active erosion (no vegetation), gullies make up 2 – 5% total area. **6**	5 – 10% of the channel bed and walls show active erosion (no vegetation), gullies make up 5 – 10% total area. **9**	10 – 50% of the channel bed and walls show active erosion (no vegetation), gullies make up 10 – 50% total area. **12**	Over 50% of the channel bed and walls show active erosion (no vegetation), gullies make up >50% total area. **15**